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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/974,817	10/12/2001	Masaharu Muramatsu	046124-5099	8262

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EXAMINER

LEWIS, MONICA

ART UNIT PAPER NUMBER

2822

DATE MAILED: 06/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/974,817

Applicant(s)

MURAMATSU, MASA HARU

Examiner

Monica Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to the amendment filed April 2, 2003.

Response to Arguments

2. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Drawings

4. Figure 10 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. It does not appear that the Request for Approval of Drawing Change was filed as applicant stated.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear what is meant by the following: a) "first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element

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partly overlap and that a substrate containing the same material as said second semiconductor image pickup element is contacted with a region at said first back-illuminated semiconductor image pickup element which does not overlap said second semiconductor image pickup element” (See Claim 9).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 2 and 5-7 are rejected under 35 U.S.C. 103(a) as obvious over Naoki (Japanese Publication No. 02-022973) in view of Applicant's Prior Art.

In regards to claim 1, Naoki discloses the following:

a) a first back-illuminated semiconductor image pickup element (1) having a front and a back and a first photosensitive region which is closer to said front than said back thereof (For Example: See Figure 1);

b) a second semiconductor image pickup element (3) also having a front and a back and a second photosensitive region which is closer to said front than back thereof (For Example: See Figure 1); and

c) first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element are secured such that respective fronts of said first back illuminated semiconductor image pick-up element and said second semiconductor image pickup element are closer to each other than their respective backs (For Example: See Figure 1).

In regards to claim 1, Naoki fails to disclose the following:

a) second semiconductor image pickup element being made of a semiconductor material different from that of said first back-illuminated semiconductor image pickup element.

However, Applicant's Prior Art discloses the use two image pickup elements made of different materials (For Example: See Page 2 Lines 1-7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Naoki to include the use of two image pickup elements made of different materials nickel as disclosed in Applicant's Prior Art because it aids in providing the optical detection of wide wavelengths (For Example: See Page 1 Lines 12-26 and Page 2 Lines 1-7).

Additionally, since Naoki and Applicant's Prior Art are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art would have been recognized in the pertinent art of Naoki.

In regards to claim 2, Naoki discloses the following:

a) mutually opposite faces of said first back- illuminated semiconductor image pickup element and said second semiconductor image pickup element are adhered via a resin (For Example: See Page 4 Lines 1-7).

In regards to claim 5, Naoki fails to disclose the following:

a) first back-illuminated semiconductor image pickup element contains Si.

However, Applicant's Prior Art discloses the use of a Si image pickup element (For Example: See Page 2 Lines 1-7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Naoki to include the use of Si image pickup element as disclosed in Applicant's Prior Art because it aids in providing the optical detection of wide wavelengths (For Example: See Page 1 Lines 12-26 and Page 2 Lines 1-7).

Additionally, since Naoki and Applicant's Prior Art are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art would have been recognized in the pertinent art of Naoki.

In regards to claim 6, Naoki fails to disclose the following:

a) second semiconductor image pickup element contains a compound semiconductor.

However, Applicant's Prior Art discloses the use of an InGaAs image pickup element (For Example: See Page 2 Lines 1-7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Naoki to include the use of an InGaAs image pickup element as disclosed in Applicant's Prior Art because it aids in providing the optical detection of wide wavelengths (For Example: See Page 1 Lines 12-26 and Page 2 Lines 1-7).

Additionally, since Naoki and Applicant's Prior Art are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art would have been recognized in the pertinent art of Naoki.

In regards to claim 7, Naoki fails to disclose the following:

a) compound semiconductor includes InGaAs.

However, Applicant's Prior Art discloses the use of an InGaAs image pickup element (For Example: See Page 2 Lines 1-7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Naoki to include the use of an InGaAs image pickup element as disclosed in Applicant's Prior Art because it aids in providing the optical detection of wide wavelengths (For Example: See Page 1 Lines 12-26 and Page 2 Lines 1-7).

Additionally, since Naoki and Applicant's Prior Art are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art would have been recognized in the pertinent art of Naoki.

9. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as obvious over Naoki (Japanese Publication No. 02-022973) in view of Applicant's Prior Art and Go (U.S. Patent No. 4,912,545).

In regards to claim 3, Naoki discloses the following:

a) a first back-illuminated semiconductor image pickup element (For Example: See Figure 1);

b) a second semiconductor image pickup element (For Example: See Figure 1);

c) first back-illuminated semiconductor image pickup element is disposed such that respective photosensitive regions of said first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element are adjacent to each other (For Example: See Figure 1); and

d) mutually opposite faces of said first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element are adhered via a bump (9) (For Example: See Figure 2).

In regards to claim 3, Naoki fails to disclose the following:

a) second semiconductor image pickup element being made of a semiconductor material different from that of said first back-illuminated semiconductor image pickup element.

However, Applicant's Prior Art discloses the use two image pickup elements made of different materials (For Example: See Page 2 Lines 1-7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Naoki to include the use of two image pickup elements made of different materials

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nickel as disclosed in Applicant's Prior Art because it aids in providing the optical detection of wide wavelengths (For Example: See Page 1 Lines 12-26 and Page 2 Lines 1-7).

Additionally, since Naoki and Applicant's Prior Art are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art would have been recognized in the pertinent art of Naoki.

b) adhered via at least three or more bumps.

However, Go discloses the use of bumps (For Example: See Figure 1A, Figure 1B and Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Naoki to include bumps as disclosed in Go because it aids in providing an electrical connection among the components (For Example: See Figure 1A, Figure 1B and Figure 2).

Additionally, since Naoki and Go are both from the same field of endeavor, the purpose disclosed by Go would have been recognized in the pertinent art of Naoki.

In regards to claim 10, Naoki fails to disclose the following:

a) mutually opposite faces of said first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element are adhered via at least three or more bumps.

However, Go discloses the use of bumps (See Figure 1A, Figure 1B and Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Jack to include bumps as disclosed in Go because it aids in providing an electrical connection among the components (For Example: See Figure 1A, Figure 1B and Figure 2).

Additionally, since Naoki and Go are both from the same field of endeavor, the purpose disclosed by Go would have been recognized in the pertinent art of Naoki.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as obvious over Naoki (Japanese Publication No. 02-022973) in view of Applicant's Prior Art, Go (U.S. Patent No. 4,912,545) and Erhardt et al. (U.S. Patent No. 5,070,380).

In regards to claim 4, Naoki discloses the following:

a) a first back-illuminated semiconductor image pickup element (For Example: See Figure 1); and

b) bump (For Example: See Figure 2).

In regards to claim 4, Naoki fails to disclose the following:

a) shift register is electrically connected via said bumps to said second semiconductor image pickup element, and that a signal from said second semiconductor image pickup element is read by driving said shift register.

However, Erhardt et al. ("Erhardt") discloses the use of a shift register (20) (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Jack to include a shift register as disclosed in Erhardt because it aids in transferring the charge carriers (For Example: See Abstract and Column 3 Lines 2-18).

Additionally, since Naoki and Erhardt are both from the same field of endeavor, the purpose disclosed by Erhardt would have been recognized in the pertinent art of Naoki.

11. Claim 8 is rejected under 35 U.S.C. 103(a) as obvious over Naoki (Japanese Publication No. 02-022973) in view of Applicant's Prior Art and Kazuo (Japanese Publication No. 10-256613).

In regards to claim 8, Naoki fails to disclose the following:

a) a cooler is in contact with a face of the second semiconductor image pickup element on the opposite side to said first back-illuminated semiconductor image pickup element.

However, Kazuo discloses the use of a cooler (For Example: See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Naoki to include the use of a cooler as disclosed in Kazuo because it aids in cooling the components (For Example: See Abstract).

Additionally, since Naoki and Kazuo are both from the same field of endeavor, the purpose disclosed by Kazuo would have been recognized in the pertinent art of Naoki.

12. Claim 9, as far as understood, is rejected under 35 U.S.C. 103(a) as obvious over Naoki (Japanese Publication No. 02-022973) in view of Applicant's Prior Art, Kazuo (Japanese Publication No. 10-256613) and Jack et al. (U.S. Patent No. 5,808,329).

In regards to claim 9, Naoki discloses the following:

a) first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element partly overlap (For Example: See Figure 2).

In regards to claim 9, Naoki fails to disclose the following:

a) a substrate containing the same material as said second semiconductor image pickup element is contacted with a region at said first back-illuminated semiconductor image pickup element which does not overlap said second semiconductor image pickup element.

However, Jack et al. ("Jack") discloses the use of a substrate and an image pickup element comprised of the same material (For Example: See Column 5 Lines 33-36). It would

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have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Naoki to include the use of a substrate and an image pickup element comprised of the same material as disclosed in Jack because it aids in improving the imaging device that has significant sensitivity to low light levels (For Example: See Column 1 Lines 45-60).

Additionally, since Naoki and Jack are both from the same field of endeavor, the purpose disclosed by Jack would have been recognized in the pertinent art of Naoki.


Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

June 20, 2003


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